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0480

#5  
Priority  
8562  
WS

26 May 2002  
BY FAX TO: (703) 892-4510  
CONFIRMATION BY MAIL

Dave or Amy Hunt  
LANDON & STARK ASSOCIATES  
One Crystal Park, Suite 210  
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Re: US Patent Application 10/133,582  
FASTENER SYSTEM  
Our Ref: 1033POU -US

Dear Dave or Amy,

Enclosed with the confirmation copy of this fax, please find the priority documents for the above referenced patent applications.

Please file them immediately in the USPTO.

Thank you very much for your fine service.

Sincerely,

*David Klein*

David Klein  
Dekel Patent Ltd.

Encl.  
Priority document (IL 142868) - 1033POU



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לשכת הפטנטים

This is to certify that annexed  
hereto is a true copy of the  
documents as originally  
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application of which  
particulars are specified on the  
first page of the annex.

זאת לתעודה כי רצופים  
בזה העתקים נכונים של  
המסמכים שהופקדו  
לכתחילה עם הבקשה  
לפטנט לפי הפרטים  
הרשומים בעמוד הראשון  
של הנספח.

היום 21-05-2002  
This

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ממונה על הבוחנים  
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Commissioner of Patents

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לשימוש הלשכה  
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מספר: Number	142868
תאריך: Date	30-04-2001
הוקדם/נדחה Ante/Post-dated	

זוגת נאמן מקור  
חוק הפטנטים, התשכ"ז - 1967  
PATENTS LAW, 5727 - 1967  
בקשה לפטנט  
Application for Patent

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בעל אמצאה מכח הדין ששמה הוא  
Owner, by virtue of the law of an invention the title of which is

(בעברית)  
מערכת חיבור  
(Hebrew)

(באנגלית)  
FASTENER SYSTEM  
(English)

*בקשת חלוקה - Application of Division		*בקשת פטנט מוסף - Application for Patent Addition			דרישה דין קדימה Priority Claim	
*חבקשת פטנט from Application		*לבקשה/לפטנט to Patent/Appl.		מספר/סימן Number/Mark	תאריך Date	מדינת האגוד Convention Country
No..... מס' dated..... מיום		No..... מס' dated..... מיום				
POA:		יפוי-כח:				
הוגש בענין המען למסירת מסמכים בישראל Address for Service in Israel						
דקל פטנט בע"מ רח' האגוז 12/4 רחובות						
Signature of the Applicant		חתימת המבקש				
For the Applicant, דוד קליין, עו"פ דקל פטנט בע"מ רח' האגוז 12/4 רחובות		עבור המבקש,				
DATE: 30.4.01		תאריך:				
REFERENCE: 1033POU-IL		סימון:				
		היום 30 _____ שנת 2001 This 30 of April 2001				
		לשימוש הלשכה For Office Use				



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This form, impressed with the Seal of the Patent Office and indicating the number and date of filing, certifies the filing of the application the particulars of which are set out above.

\*מחק את המיותר Delete whatever is inapplicable

**מערכת חיבור**

**FASTENER SYSTEM**

1033POU-IL

## FASTENER SYSTEM

### FIELD OF THE INVENTION

The present invention relates generally to fastener systems, and particularly to a system and method for fastening elongate elements, such as rods, to planar elements, such as plates.

### BACKGROUND OF THE INVENTION

Many kinds of mechanical fasteners are known for assembling shelves, desks, beds and the like. Besides the familiar nuts, bolts, screws, nails and rivets, there are different kinds of connectors for making all kinds of constructions from metal, plastic, wood, glass and the like. However, it is not easy to fasten certain structural elements made of different materials to one another. For example, it is not an easy task to fasten metal rods to glass plate, without the fastener inflicting damage to one of the parts. Furthermore, it is not a straightforward task to make the connection adjustable along any length of the rods.

### SUMMARY OF THE INVENTION

The present invention seeks to provide an improved fastening system that is suited for fastening for elongate elements, such as rods, to planar elements, such as plates. The connection is easily and quickly adjustable along any length of the elongate elements, yet is very strong and reliable.

It is noted that throughout the specification and claims the term "elongate element" encompasses any elongate structural member, such as a bar, rod, pole, wire and the like, of any size or diameter.

There is thus provided in accordance with a preferred embodiment of the present invention a fastening system including a connector element including a conical head portion from which extends a threaded shank, a hole being formed through the head portion and the shank, the head portion being resiliently squeezable in a generally radially inwards direction.

In accordance with a preferred embodiment of the present invention, the system further includes an elongate element that passes through the hole, a planar element with a countersunk aperture formed therein, wherein the conical head portion is received in the countersunk aperture, and a threaded nut element threadedly fastened to the threaded shank, wherein tightening of the nut element fixedly wedges the conical head portion in the countersunk aperture and fixedly squeezes the head portion against the elongate element.

In accordance with another preferred embodiment of the present invention, the system further includes an elongate element that passes through the hole, a planar element with an

aperture formed therein, a conical sleeve member formed with a countersunk aperture, wherein the sleeve member is received in the aperture of the planar element and the conical head portion is received in the countersunk aperture of the sleeve member, and a threaded nut element threadedly fastened to the threaded shank, wherein tightening of the nut element  
5 fixedly wedges the conical head portion in the countersunk aperture and the sleeve member in the aperture of the planar element, and fixedly squeezes the head portion against the elongate element.

In accordance with yet another preferred embodiment of the present invention, the system further includes an elongate element, a planar element with an aperture formed  
10 therein, a conical sleeve member formed with a countersunk aperture, wherein the conical head portion sits in the countersunk aperture, a washer member including a rim portion extending from a hollow body portion, wherein the body portion is received in the hole of the connector element and the elongate element passes through the hollow body portion, and the planar element is intermediate the rim portion and the sleeve member, and a threaded nut  
15 element threadedly fastened to the threaded shank, wherein tightening of the nut element fixedly wedges the conical head portion in the countersunk aperture, and fixedly squeezes the head portion against the body portion and against the elongate element, and traps the planar element between the rim portion and the sleeve member.

Further in accordance with a preferred embodiment of the present invention the head  
20 portion is formed with slits that define petal portions, the petal portions being resiliently squeezable in a generally radially inwards direction.

Still further in accordance with a preferred embodiment of the present invention the connector element is formed with at least one lengthwise axial cut extending from a periphery of the head portion and the shank at least partially through to the hole.

25 In accordance with a preferred embodiment of the present invention the planar element and the connector element include an anti-rotation connection.

Further in accordance with a preferred embodiment of the present invention a combination of at least two of the planar element, the connector element, the sleeve member and the washer member includes an anti-rotation connection.

30 Examples of articles constructed with the fastening system are shown hereinbelow.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a simplified, partially sectional illustration of a fastening system, constructed and operative in accordance with a preferred embodiment of the present invention; and

Figs. 2A and 2B are simplified side-view and top-view, partially sectional illustrations, respectively, of a connector element of the fastening system of Fig. 1;

5 Fig. 2C is a simplified illustration of a connector element of the fastening system of Fig. 1 with a lengthwise axial cut, in accordance with a preferred embodiment of the present invention;

10 Fig. 3 is a simplified, partially sectional illustration of the fastening system of Fig. 1, constructed and operative in accordance with another preferred embodiment of the present invention;

Fig. 4 is a simplified, partially sectional illustration of the fastening system of Fig. 1, constructed and operative in accordance with yet another preferred embodiment of the present invention; and

15 Figs. 5A-5E are simplified illustrations of examples of articles constructed with the fastening system of the present invention.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1, which illustrates a fastening system 10, constructed and operative in accordance with a preferred embodiment of the present invention.

20 Fastening system 10 preferably includes a connector element 12 comprising a conical head portion 14 from which extends a threaded shank 16. A hole 18 is preferably formed through head portion 14 and shank 16. Head portion 14 is resiliently squeezable in a generally radially inwards direction, as indicated by arrows 19. Accordingly head portion 14 may be constructed of a sufficiently flexible plastic or similar material.

25 Referring additionally to Figs. 2A and 2B, head portion 14 may be formed with slits 20 that define petal portions 22. Petal portions 22 are resiliently squeezable in the generally radially inwards direction.

30 In Figs. 2A and 2B, shank 16 has a contiguous perimeter. An alternate construction is shown in Fig. 2C, wherein connector element 12 is formed with one or more lengthwise axial cuts 24 extending from a periphery of head portion 14 and shank 16 at least partially through to hole 18. Fig. 2C shows an embodiment wherein two axial cuts 24 are cut completely through to hole 18, thereby cutting connector element 12 into two halves. This permits slipping connector element 12 over curved rods, pipes and the like (such as in the shower apparatus of Fig. 5D).

Reference is now made again to Fig. 1, which illustrates a possible construction that may be made with fastening system 10. An elongate element 26, such as, but not limited to, a metal, plastic or wooden rod, for example, passes through hole 18. A planar element 28, such as, but not limited to, a metal, plastic or glass plate, or a wall, for example, is formed with a countersunk aperture 30. The conical head portion 14 is received in countersunk aperture 30. A threaded nut element 32 is threadedly fastened to shank 16. Tightening nut element 32 causes connector element to advance generally in the direction of an arrow 34, thereby fixedly wedging head portion 14 in countersunk aperture 30, and fixedly squeezing head portion 14 against elongate element 26. This forms a secure connection between elongate element 26 and planar element 28.

Reference is now made to Fig. 3, which illustrates the fastening system 10, constructed and operative in accordance with another preferred embodiment of the present invention. In this embodiment, a conical sleeve member 36 is provided, formed with a countersunk or chamfered aperture 38. Sleeve member 36 is received in an aperture 40 formed in planar element 28, and may have a rim 42 that overlaps a surface of planar element 28. Conical head portion 14 is received in countersunk aperture 38 of sleeve member 36. As similarly described hereinabove, tightening nut element 32 causes connector element to advance generally in the direction of arrow 34, thereby fixedly wedging head portion 14 in countersunk aperture 38 and sleeve member 36 in aperture 40 of planar element 28, and fixedly squeezing head portion 14 against elongate element 26. This forms a secure connection between elongate element 26 and planar element 28. Sleeve member 36 acts as a protective washer for the connection to planar element 28.

Reference is now made to Fig. 4, which illustrates the fastening system 10, constructed and operative in accordance with yet another preferred embodiment of the present invention. In this embodiment, a washer member 44 is provided, comprising a rim portion 46 extending from a hollow body portion 48. The body portion 48 is received in hole 18 of connector element 12, and elongate element 26 passes through body portion 48. The planar element 28 is intermediate rim portion 46 and sleeve member 36. As similarly described hereinabove, tightening nut element 32 causes connector element to advance generally in the direction of arrow 34, thereby fixedly wedging head portion 14 in countersunk aperture 38, and fixedly squeezing head portion 14 against body portion 48 and elongate element 26. The tightening action also causes sleeve member 36 to move against planar element 28, generally in the direction of an arrow 49, thereby trapping planar element 28 between rim portion 46 and sleeve member 36. This forms a secure connection between elongate element 26 and



planar element 28. Sleeve member 36 and washer member 44 serve as protective elements for the connection to planar element 28, which may be particularly effective for connecting metal rods to glass plates, for example.

Any combination of the elements of fastening system 10 may comprise an anti-rotation connection. For example, as seen in Fig. 2A, planar element 28 and connector element 12 may comprise a tongue-in-groove connection, such as a tongue 50 protruding from one of the petals 22 that is received in a groove 52 formed in planar element 28. Similarly, as seen in Fig. 3, connector element 12 and sleeve member 36, or sleeve member 36 and planar element 28, may comprise a tongue-in-groove connection 54. The same may hold true for any combination of at least two of planar element 28, connector element 12, sleeve member 36 and washer member 44, which may comprise a tongue-in-groove connection 56, as seen in Fig. 4.

One of the advantages of the fastening system 10 of the present invention is that one can easily adjust or set the height of elongate element 26 with respect to planar element 28 at any point. For example, planar element 28 may be a shelf and elongate element 26 may be a pole for a set of shelves. The shelves may be placed at any arbitrary height. This is in contrast to the prior art, wherein the shelves may be placed generally only at preset discrete points.

Reference is now made to Figs. 5A-5E, which illustrate examples of articles that may be constructed with fastening system 10 of the present invention, such as, but not limited to, a table 60, shelf 62, furniture 64, shower apparatus 66, and wagon 68.

It will be appreciated by person skilled in the art, that the present invention is not limited by what has been particularly shown and described herein above. Rather the scope of the present invention is defined only by the claims which follow:

6  
CLAIMS

What is claimed is:

1. A fastening system comprising:

a connector element comprising a conical head portion from which extends a threaded shank, a hole being formed through said head portion and said shank, said head portion being resiliently squeezable in a generally radially inwards direction.

2. The fastening system according to claim 1 and further comprising:

an elongate element that passes through said hole;

a planar element with a countersunk aperture formed therein, wherein said conical head portion is received in said countersunk aperture; and

a threaded nut element threadedly fastened to said threaded shank, wherein tightening of said nut element fixedly wedges said conical head portion in said countersunk aperture and fixedly squeezes said head portion against said elongate element.

3. The fastening system according to claim 1 and further comprising:

an elongate element that passes through said hole;

a planar element with an aperture formed therein;

a conical sleeve member formed with a countersunk aperture, wherein said sleeve member is received in said aperture of said planar element and said conical head portion is received in said countersunk aperture of said sleeve member; and

a threaded nut element threadedly fastened to said threaded shank, wherein tightening of said nut element fixedly wedges said conical head portion in said countersunk aperture and said sleeve member in said aperture of said planar element, and fixedly squeezes said head portion against said elongate element.

4. The fastening system according to claim 1 and further comprising:

an elongate element;

a planar element with an aperture formed therein;

a conical sleeve member formed with a countersunk aperture, wherein said conical head portion sits in said countersunk aperture;

a washer member comprising a rim portion extending from a hollow body portion, wherein said body portion is received in said hole of said connector element and said elongate element passes through said hollow body portion, and said planar element is intermediate said rim portion and said sleeve member; and

a threaded nut element threadedly fastened to said threaded shank, wherein tightening of said nut element fixedly wedges said conical head portion in said countersunk aperture, and

fixedly squeezes said head portion against said body portion and against said elongate element, and traps said planar element between said rim portion and said sleeve member.

5. The fastening system according to claim 1 wherein said head portion is formed with slits that define petal portions, said petal portions being resiliently squeezable in a generally radially inwards direction.

6. The fastening system according to claim 1 wherein said connector element is formed with at least one lengthwise axial cut extending from a periphery of said head portion and said shank at least partially through to said hole.

7. The fastening system according to claim 2 wherein said planar element and said connector element comprise an anti-rotation connection.

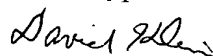
8. The fastening system according to claim 3 wherein a combination of at least two of said planar element, said connector element and said sleeve member comprises an anti-rotation connection.

9. The fastening system according to claim 4 wherein a combination of at least two of said planar element, said connector element, said sleeve member and said washer member comprises an anti-rotation connection.

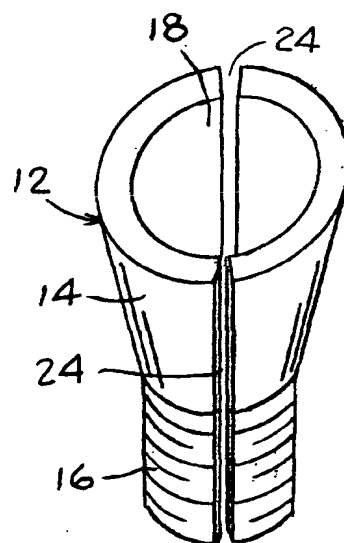
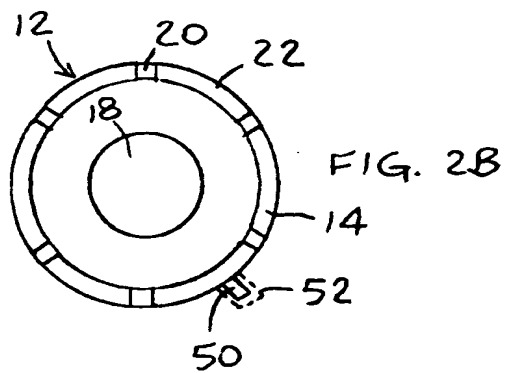
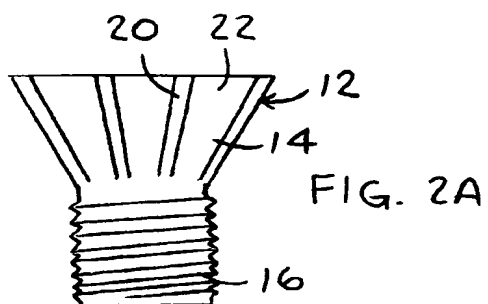
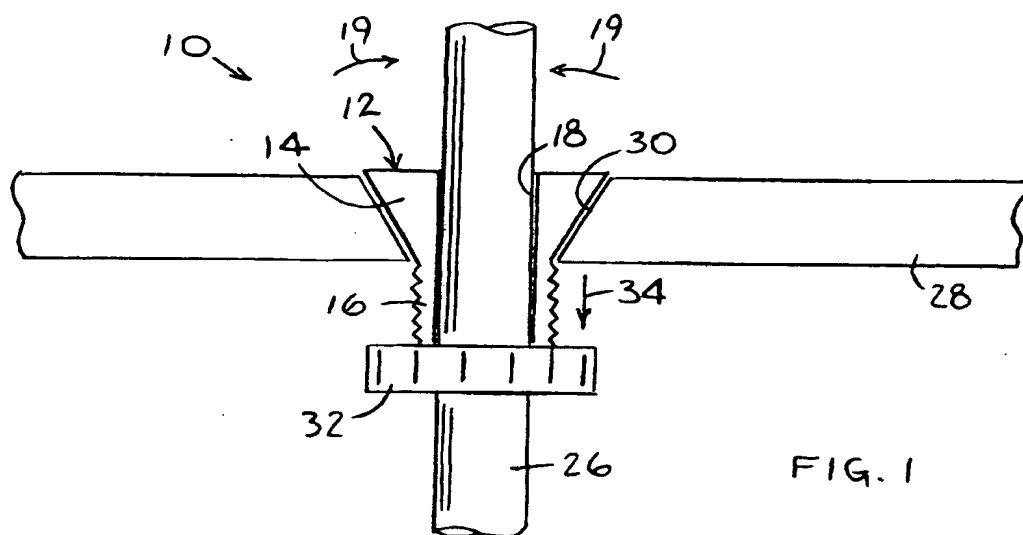
10. An article constructed with the fastening system according to any of the preceding claims.

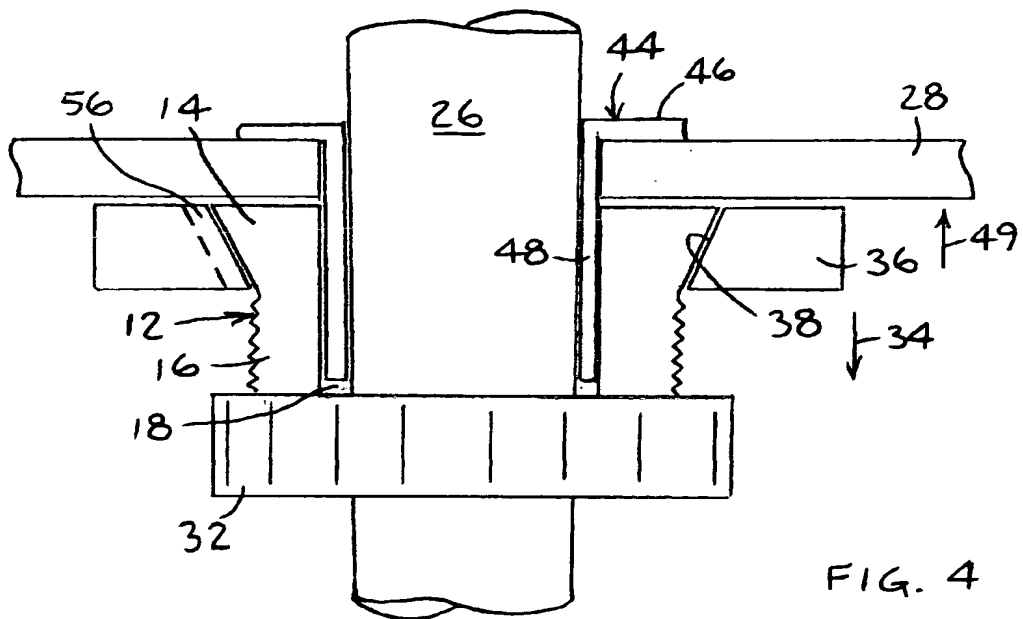
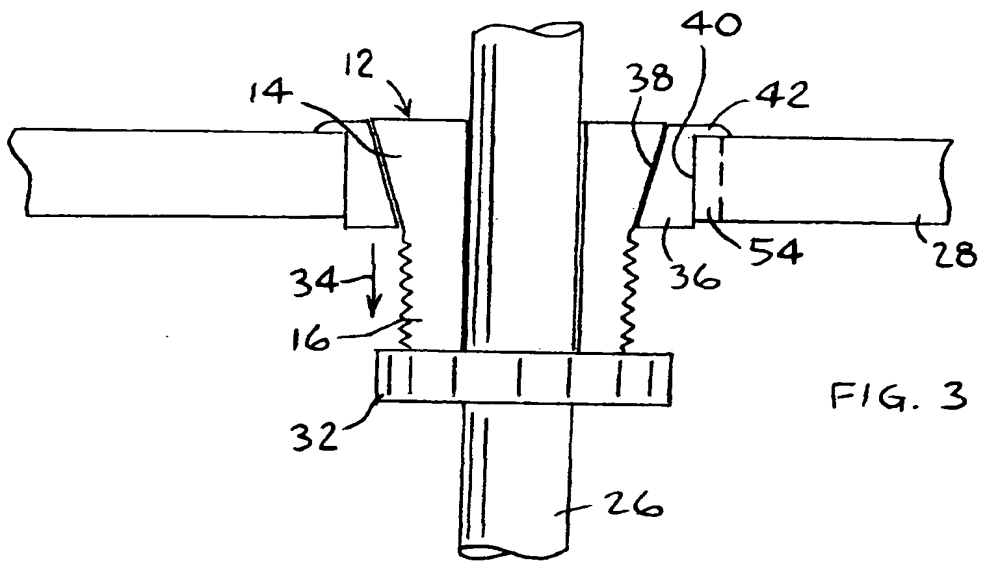
11. The fastening system according to any of the preceding claims 1-9 and substantially as described and shown hereinabove.

For the Applicant,



David Klein, Patent Attorney  
Dekel Patent Ltd.





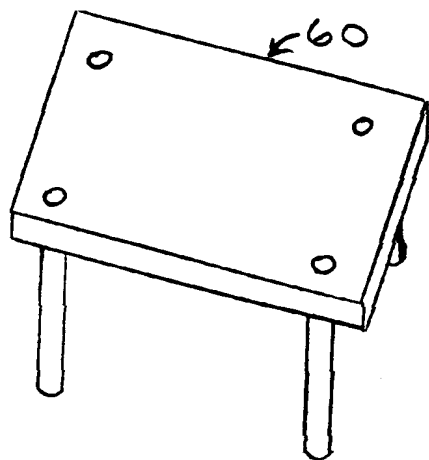


FIG. 5A

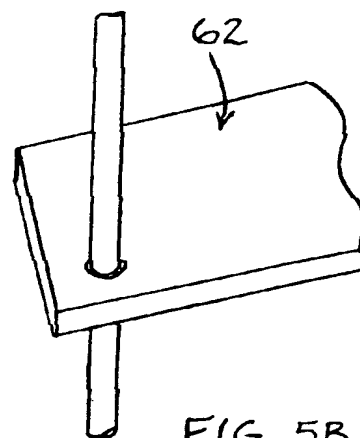


FIG. 5B

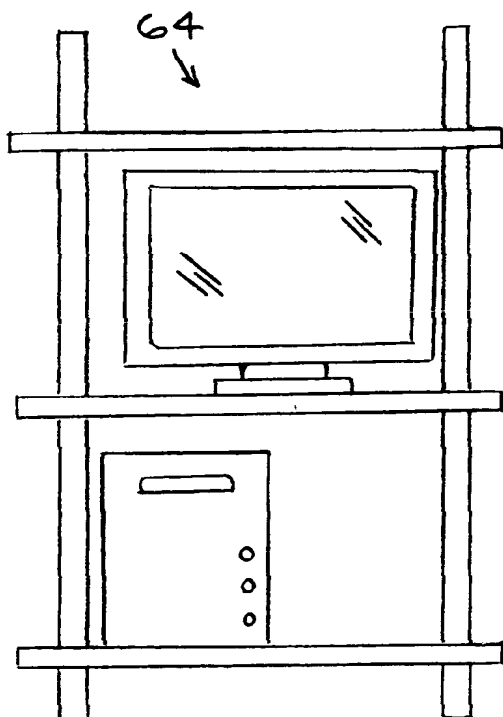


FIG. 5C

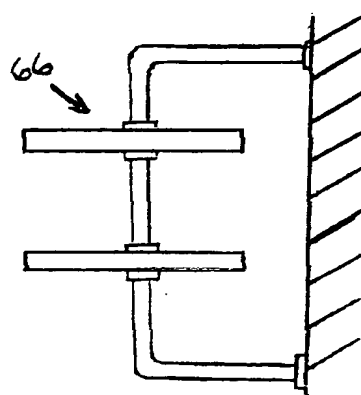


FIG. 5D

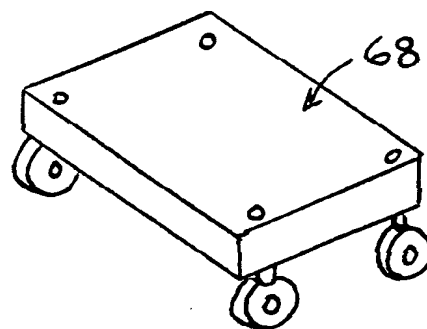


FIG. 5E